

## A CHROMOSOME STUDY

In this activity, you will create a karyotype from a page of mixed chromosomes. Karyotypes are created by matching homologous pairs and numbering them from largest to smallest. Abnormalities, such as extra or deleted chromosomes can then be diagnosed. Pictured chromosomes will be used for this model rather than real chromosomes, but the process is the same for real chromosomes extracted from cell or fetal samples.

Two karyotypes will be created - A karyotype is a pattern or picture of chromosomes from one cell **grouped into pairs** and **organized by size**. The first you will create represents a normal human karyotype of a male or a female, the second represents and abnormal karyotype. You will then compare and diagnose the abnormality present in the patient of the second karyotype.



### Normal Human Karyotype

- Obtain the page marked "normal" - these are pictures of chromosomes from a normal human.
- Cut each chromosome out and set the ones labeled X & Y aside.
- Pair each chromosome up with its match - the X & Y will not match.
- Arrange the chromosomes in pairs from largest to smallest. **NUMBER** them starting from one.
- Place the sex chromosomes last, at the #23 spot.

1. How many total chromosomes are present in this karyotype? \_\_\_\_\_

2. How many sex chromosomes are present? \_\_\_\_\_

How many autosomes (not sex chromosomes)? \_\_\_\_\_

3. What is your person's sex chromosomes (XX or XY)? \_\_\_\_\_ Is this a boy or girl? \_\_\_\_\_

Body cells are called somatic cells. Somatic cells include the skin, liver, muscle, stomach and other bodily cells. The karyotype you prepared is from a somatic human cell. The term **diploid chromosome number** refers to the number of chromosomes in a somatic cell. The diploid number varies from species to species, however it does not differ from somatic cell to somatic cell within the same organism. To find your diploid number, simply count the number of chromosomes in your karyotype.

4. What is the diploid chromosome number for your karyotype? \_\_\_\_\_

The **HAPLOID CHROMOSOME NUMBER** refers to the number of chromosomes in an organism's sex cells. Sperm in males, eggs in females. The **haploid number**, is always -half- that of the diploid number.

5. What would the haploid chromosome number for your karyotype be? \_\_\_\_\_

### Abnormal Human Karyotype

- Obtain the page marked "abnormal" - there is more than one set, take note of which set you have (A, B, C, D) → \_\_\_\_\_
- Cut each chromosome out and set any labeled ones (X, Y) aside.
- Pair each chromosome up with its match - the X & Y will not match.
- Arrange the chromosomes in pairs from largest to smallest. **NUMBER** them starting from one.
- Place the sex chromosomes last, at the #23 spot.

# Lab 2a Chromosome Study Answer Key

**Oak Ridge National Laboratory**



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*Chromosome Analysis Protocols* John R. Gosden, 2008-02-02 Chromosomes as the genetic vehicles provide the basic material for a large proportion of genetic investigations from the construction of gene maps and models of chromosome organization to the investigation of gene function and dysfunction The study of chromosomes has developed in parallel with other aspects of molecular genetics beginning with the first preparations of chromosomes from animal cells through the development of banding techniques which permitted the unequivocal identification of each chromosome in a karyotype to the present analytical methods of molecular cytogenetics Although some of these techniques have been in use for many years and can be learned relatively easily most published scientific reports as a result of pressure on space from editors and the response to that pressure by authors contain little in the way of technical detail and thus are rarely adequate for a researcher hoping to find all the necessary information to embark on a method from scratch A new user needs not only a detailed description of the methods but also some help with problem solving and sorting out the difficulties encountered in handling any biological system This was the requirement to which the series *Methods in Molecular Biology* is addressed and *Chromosome Analysis Protocols* forms a part of this series

**The AGT Cytogenetics Laboratory Manual** Marilyn S. Arsham, Margaret J. Barch, Helen J. Lawce, 2017-04-24 Cytogenetics is the study of chromosome morphology structure pathology function and behavior The field has evolved to embrace molecular cytogenetic changes now termed cytogenomics Cytogeneticists utilize an assortment of procedures to investigate the full complement of chromosomes and or a targeted region within a specific chromosome in metaphase or interphase Tools include routine analysis of G banded chromosomes specialized stains that address specific chromosomal structures and molecular probes such as fluorescence in situ hybridization FISH and chromosome microarray analysis which employ a variety of methods to highlight a region as small as a single specific genetic sequence under investigation The AGT Cytogenetics Laboratory Manual Fourth Edition offers a comprehensive description of the diagnostic tests offered by the clinical laboratory and explains the science behind them One of the most valuable assets is its rich compilation of laboratory tested protocols currently being used in leading laboratories along with practical advice for nearly every area of interest to cytogeneticists In addition to covering essential topics that have been the backbone of cytogenetics

for over 60 years such as the basic components of a cell use of a microscope human tissue processing for cytogenetic analysis prenatal constitutional and neoplastic laboratory safety and the mechanisms behind chromosome rearrangement and aneuploidy this edition introduces new and expanded chapters by experts in the field Some of these new topics include a unique collection of chromosome heteromorphisms clinical examples of genomic imprinting an example driven overview of chromosomal microarray mathematics specifically geared for the cytogeneticist usage of ISCN s cytogenetic language to describe chromosome changes tips for laboratory management examples of laboratory information systems a collection of internet and library resources and a special chapter on animal chromosomes for the research and zoo cytogeneticist The range of topics is thus broad yet comprehensive offering the student a resource that teaches the procedures performed in the cytogenetics laboratory environment and the laboratory professional with a peer reviewed reference that explores the basis of each of these procedures This makes it a useful resource for researchers clinicians and lab professionals as well as students in a university or medical school setting

**Nuclear Science Abstracts** ,1973      Laboratory Course in Histology Adolph Elwyn,Oliver Smith Strong,1920      **Publications, Reports, and Papers for 1961- from Oak Ridge National Laboratory** Oak Ridge National Laboratory,1965      **Cell Fate** Chin-Hsing Annie Lin,Laura Buttitta,Lisa Maves,F. Jeffrey Dilworth,Michael T. Chin,Carlos A. Paladini,2016-06-24 The fundamental question of how an undifferentiated progenitor cell adopts a more specialized cell fate that then contributes to the development of specialized tissues organs organ systems and ultimately a unique individual of a given species has intrigued cell and developmental biologists for many years Advances in molecular and cell biology have enabled investigators to identify genetic and epigenetic factors that contribute to these processes with increasing detail and also to define the various molecular characteristics of each cell fate with greater precision Understanding these processes have also provided greater insights into disorders in which the normal mechanisms of cell fate determination are altered such as in cancer and inherited malformations With these advances have come techniques that facilitate the manipulation of cell fate which have the potential to revolutionize the field of medicine by facilitating the repair and or regeneration of diseased organs Given the rapid advances that are occurring in the field the articles in this eBook are both relevant and timely These articles originally appeared online as part of the Research Topic Cell Fate overseen by my colleagues Dr Lin Dr Buttitta Dr Maves Dr Dilworth Dr Paladini and myself and have been viewed extensively Because of their popularity they are now made available as an eBook in a more easily downloadable form Michael T Chin      **Papers from the Tortugas Laboratory of the Carnegie Institution of Washington** Carnegie Institution of Washington. Tortugas Laboratory,1914      Contributions from the Zoological Laboratory University of Pennsylvania. Zoological Laboratory,1927 Vols for 189 1956 58 are reprinted from various scientific journals      Publications, Reports and Papers for ... from Oak Ridge National Laboratory Oak Ridge National Laboratory,1964      **Contributions from the Zoological Laboratory of the University of Pennsylvania** University of Pennsylvania. Zoological Laboratory,1927

**Laboratory Procedures in Human Genetics** Archana Sharma, Geeta Talukder, 1974      Contributions from the Zoological Laboratory of the University of Pennsylvania, 1911      Publications, Reports, and Papers for 1965 from Oak Ridge National Laboratory K.O. Johnsson, A.S. Haas, 1966      **RPSC-Rajasthan Senior Teacher Science Exam Paper-II E book** Dr Chandresh Agrawal, nandini books, 2024-07-25 SG The E book RPSC Rajasthan Senior Teacher Science Exam Paper II Covers Science Subject Objective Questions Asked In Similar Previous Years Papers With Answers

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